

*Results of Micrometer Measures of Double Stars made with the 28-inch Refractor at the Royal Observatory, Greenwich, in the year 1905.*

(Communicated by the Astronomer Royal.)

The measures were made with a bifilar position-micrometer on the 28-inch refractor, focal length 28 feet. The power generally employed was 670. When bright stars were observed a blue glass shade was usually employed to diminish the light and irradiation. The observations were made in variously coloured fields or in a dark field with illuminated wires. The initials in the last column are those of the observers, viz.

L.	Mr. Lewis	H.F.	Mr. Furner.
W.B.	Mr. Bowyer	Bk.	M. Van Biesbroeck.

M. Van Biesbroeck, of Brussels, spent some time at the Observatory, studying the details of various departments. On nights when the definition was not sufficiently good for measuring stars in the ordinary working list the time was spent in measuring stars from a supplementary list made up of Struve stars which have been neglected, or which require periodical observation at intervals of ten years or so, and of miscellaneous stars in which the companion is very faint. As measures of such pairs are not of immediate interest a list only of the stars observed is given here, the publication of the measures, as well as of the individual results of the observations of the other stars, being reserved for the volume of *Greenwich Observations* for 1905.

In general the present list of measures is confined to stars of which the separation is under 4", or which show orbital movement.

*Stars in the Supplementary List observed in 1905.*

Struve Stars.

Σ 1955	Σ 2137	Σ 2336	Σ 2655	Σ 2734	Σ 2931
1953	2140 AB	2327	2664	2736	2932
1963	2140 AC	2364	2679	2738	2941
1964	2188	2376	2680	2761	2946
1977	2201	2381	2686	2763	2992
1992	2202	2385	2691	2831	3014
2003	2213	2390	2688	2833	3018
2005 AC	2211	2396	2692	2848	3021
2008	2217	2424	2700	2852	3028
2032 AC	2224	2426	2702	2867	3039
2040	2228	2530	2708	2877	3042
2095	2232	2585	2709	2890	3044
2104	2233 AC	2618	2713	2897	3055
2109	2233 AD	2622 AB	2714	2898	3058
2110	2264	2622 AC	2715	2902	3097
2115	2269	2631	2718	2910	3132
2113	2295	2633	2722	2916 AB	3134
2142	2311	4263	2725	2916 AC	

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Otto Struve Stars.

O $\Sigma$  225, 230, 362, and 535 AC

Hough Stars.

Ho, 204, 475, 609 AC, 609 AD, 609 AE, and 614.

Miscellaneous Stars.

Burnham 151  $\frac{AB}{2}$  C

G. A. 5.

B.D. + 21 $^{\circ}$ 3994 AC

*Micrometric Observations of Double Stars at the Royal Observatory, Greenwich.*

Star's Name.	R.A. 1900. h m	N.P.D. 1900. $^{\circ}$ ' "	Posi- tion Angle. $^{\circ}$	Dis- tance. "	No. of Nights	Mags.	Epoch 1905.	Obs.
$\Sigma$ 3060 ...	0 1	72 29	118 $^{\circ}$ 9	3 $''$ 50	1	8.7 8.7	.994	W.B.
Ho. 1 ...	0 6	61 10	170 $^{\circ}$ 3	1 $''$ 19	1	8.5 8.8	.909	L.
A.G. 56 ...	0 12	68 47	133 $^{\circ}$ 9	2 $''$ 25	3	8.9 9.4	.639	W.B.
Ho. 305 ...	0 33	65 19	193 $^{\circ}$ 2	5 $''$ 91	2	8 11	.912	W.B.
Ho. 306 ...	0 43	64 59	165 $^{\circ}$ 9	1 $''$ 13	2	8.5 8.8	.529	W.B.
$\beta$ 495 ...	0 44	71 51	28 $^{\circ}$ 9	0 $''$ 57	1	7.5 7.7	.887	W.B.
$\Sigma$ 73 ...	0 50	66 55	25 $^{\circ}$ 8	0 $''$ 96	2	6.2 6.8	.912	W.B.
$\beta$ 302 ...	0 53	69 9	117 $^{\circ}$ 2	0 $''$ 57	1	6.8 8.0	.887	W.B.
Ho. 310 ...	1 20	61 1	356 $^{\circ}$ 7	1 $''$ 57	1	9.0 9.2	.830	W.B.
Ho. 9 ...	1 24	68 45	96 $^{\circ}$ 2	2 $''$ 83	2	9 10	.912	W.B.
$\beta$ 507 ...	1 30	63 44	151 $^{\circ}$ 3	1 $''$ 86	1	8.0 11.0	.917	W.B.
Ho. 311 ...	1 46	65 48	185 $^{\circ}$ 7	0 $''$ 49	1	7.0 7.2	.830	W.B.
$\Sigma$ 194 ...	1 54	65 39	276 $^{\circ}$ 1	0 $''$ 97	3	8.0 8.3	.056	W.B.
			272 $^{\circ}$ 6	1 $''$ 46	1	...	.049	L.
Ho. 11 ...	1 54	56 13	141 $^{\circ}$ 9	4 $''$ 85	1	9.0 9.4	.994	W.B.
Ho. 312 ...	2 1	64 45	345 $^{\circ}$ 5	0 $''$ 97	2	6.5 12.0	.044	L.
$\Sigma$ 226 ...	2 7	66 30	246 $^{\circ}$ 5	2 $''$ 26	2	7.8 9.7	.039	L.
Hu. 424 ...	2 8	66 44	335 $^{\circ}$ 4	1 $''$ 56	3	9.0 11.0	.046	L.
Ho. 216 ...	2 21	59 9	344 $^{\circ}$ 1	1 $''$ 14	2	8.0 10.0	.030	L.
			338 $^{\circ}$ 3	0 $''$ 95	1	...	.033	H.F.
$\Sigma$ 269 ...	2 21	60 34	324 $^{\circ}$ 7	1 $''$ 93	1	7.5 9.8	.917	W.B.
Hu. 428 ...	2 23	67 7	68 $^{\circ}$ 7	0 $''$ 57	1	9.2 9.5	.011	L.
$\beta$ 306 ...	2 38	64 48	16 $^{\circ}$ 7	3 $''$ 01	3	6.7 11.0	.027	L.
Hu. 430 ...	2 38	69 26	188 $^{\circ}$ 2	0 $''$ 77	1	8.5 12.8	.066	L.
Ait. 826 ...	2 39	58 56	165 $^{\circ}$ 7	4 $''$ 16	1	8.7 11.8	.066	L.
$\Sigma$ 305 ...	2 42	71 2	311 $^{\circ}$ 8	2 $''$ 99	3	7.3 8.2	.038	W.B.
Ho. 217 ...	2 43	55 54	276 $^{\circ}$ 2	2 $''$ 87	1	8.5 10.7	.033	H.F.

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Star's Name.	R.A. 1900.	N.P.D. 1900.	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
$\beta$ 525 ...	h m 2 53	$^{\circ}$ $'$ 68 47	$^{\circ}$ 139 $^{\circ}$ 4	$''$ 0 $''$ 50	1	7 $\cdot$ 5 7 $\cdot$ 5	'049	L.
$\Sigma$ 333 ...	2 54	69 4	198 $^{\circ}$ 0	1 $\cdot$ 11	3	5 $\cdot$ 7 6 $\cdot$ 0	'047	W.B.
Ho. 318 ...	2 54	73 19	205 $\cdot$ 5	3 $\cdot$ 15	1	9 $\cdot$ 1 9 $\cdot$ 1	'994	W.B.
$\Sigma$ 346 ...	2 58	65 8	89 $\cdot$ 0	0 $\cdot$ 39	1	6 $\cdot$ 0 6 $\cdot$ 0	'074	W.B.
$\beta$ 1030 ...	3 4	68 39	143 $\cdot$ 4	0 $\cdot$ 45	2	8 $\cdot$ 4 8 $\cdot$ 4	'078	W.B.
Ho. 14 ...	3 28	62 2	24 $\cdot$ 6	2 $\cdot$ 07	1	8 $\cdot$ 2 8 $\cdot$ 7	'994	W.B.
$\beta$ 533 ...	3 29	58 39	48 $\cdot$ 6	0 $\cdot$ 80	1	7 $\cdot$ 0 7 $\cdot$ 0	'066	L.
Ho. 504 ...	3 38	54 29	182 $\cdot$ 6	0 $\cdot$ 88	1	7 $\cdot$ 8 8 $\cdot$ 0	'112	W.B.
Ho. 324 ...	3 44	75 18	332 $\cdot$ 8	0 $\cdot$ 64	3	8 $\cdot$ 1 8 $\cdot$ 3	'127	W.B.
			339 $\cdot$ 3	0 $\cdot$ 72	1	...	'033	H.F.
Hu. 24 ...	3 52	78 48	267 $\cdot$ 1	0 $\cdot$ 81	1	8 $\cdot$ 5 11 $\cdot$ 3	033	H.F.
Hu. 25 ...	3 53	78 10	324 $\cdot$ 9	0 $\cdot$ 81	1	8 $\cdot$ 6 9 $\cdot$ 1	'033	H.F.
Hu. 27 ...	3 54	80 29	214 $\cdot$ 3	0 $\cdot$ 53	1	8 $\cdot$ 1 8 $\cdot$ 5	'033	H.F.
Hu. 28 ...	3 54	78 50	340 $\cdot$ 3	1 $\cdot$ 21	1	9 $\cdot$ 0 9 $\cdot$ 2	'033	H.F.
$\Sigma$ 520 ...	4 12	67 27	113 $\cdot$ 8	0 $\cdot$ 61	3	8 $\cdot$ 0 8 $\cdot$ 0	'078	W.B.
$\Sigma$ 535 ...	4 18	78 51	323 $\cdot$ 1	1 $\cdot$ 64	2	6 $\cdot$ 7 8 $\cdot$ 2	'077	W.B.
Ho. 15 ...	4 18	60 7	147 $\cdot$ 4	0 $\cdot$ 72	2	8 $\cdot$ 0 8 $\cdot$ 0	'167	W.B.
$\beta$ 1186 ...	4 22	79 1	172 $\cdot$ 8	0 $\cdot$ 51	1	6 $\cdot$ 8 9 $\cdot$ 7	'151	H.F.
O $\Sigma$ 86 ...	4 31	70 15	54 $\cdot$ 4	0 $\cdot$ 45	1	7 $\cdot$ 5 7 $\cdot$ 5	'044	W.B.
$\Sigma$ 567 ...	4 31	70 43	320 $\cdot$ 9	1 $\cdot$ 86	2	8 $\cdot$ 5 9 $\cdot$ 0	'035	W.B.
$\Sigma$ 572 ...	4 32	63 18	201 $\cdot$ 5	3 $\cdot$ 76	2	6 $\cdot$ 5 6 $\cdot$ 5	'035	W.B.
Ho. 333 ...	4 38	69 53	158 $\cdot$ 6	2 $\cdot$ 17	1	9 $\cdot$ 2 9 $\cdot$ 3	'994	W.B.
Ho. 17 AB	4 53	59 8	56 $\cdot$ 5	4 $\cdot$ 36	2	7 $\cdot$ 5 10 $\cdot$ 0	'049	W.B.
Ho. 222 ...	4 53	58 34	219 $\cdot$ 3	1 $\cdot$ 87	1	7 $\cdot$ 7 10 $\cdot$ 5	'049	L.
$\beta$ 1238 ...	4 55	63 36	7 $\cdot$ 2	1 $\cdot$ 56	1	8 $\cdot$ 1 11 $\cdot$ 5	'022	L.
Ho. 225 ...	5 16	77 26	111 $\cdot$ 9	0 $\cdot$ 46	3	8 $\cdot$ 0 8 $\cdot$ 1	'164	W.B.
Ho. 226 ...	5 21	62 29	238 $\cdot$ 6	0 $\cdot$ 57	4	7 $\cdot$ 0 7 $\cdot$ 0	'155	W.B.
			238 $\cdot$ 4	0 $\cdot$ 81	1	...	'153	L.
$\Sigma$ 749 ...	5 31	63 8	172 $\cdot$ 2	0 $\cdot$ 66	3	7 $\cdot$ 0 7 $\cdot$ 1	'034	W.B.
Hu. 38 ...	5 39	67 8	140 $\cdot$ 8	0 $\cdot$ 48	3	8 $\cdot$ 6 8 $\cdot$ 8	'148	W.B.
			141 $\cdot$ 9	0 $\cdot$ 56	1	...	'208	H.F.
B.D. + 20 $^{\circ}$ 1259	6 1	69 53	187 $\cdot$ 3	2 $\cdot$ 14	1	8 $\cdot$ 7 10 $\cdot$ 0	'022	L.
			192 $\cdot$ 0	1 $\cdot$ 27	1	...	'151	H.F.
Ho. 228 ...	6 1	77 31	271 $\cdot$ 2	2 $\cdot$ 47	2	8 $\cdot$ 0 11 $\cdot$ 0	'162	W.B.
B.D. + 24 $^{\circ}$ 1161	6 7	65 33	178 $\cdot$ 3	1 $\cdot$ 32	2	9 $\cdot$ 0 9 $\cdot$ 2	'056	W.B.
Ho. 24 ...	6 13	80 38	156 $\cdot$ 0	4 $\cdot$ 22	1	8 $\cdot$ 0 11 $\cdot$ 0	'225	H.F.
Ho. 230 ...	6 13	76 11	61 $\cdot$ 5	1 $\cdot$ 94	2	8 $\cdot$ 2 10 $\cdot$ 5	'162	W.B.

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Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° ' "	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905	Obs.
Σ 888 AC ...	6 14	61 31	258°2	3'16	1	7.5 9.2	·030	W.B.
B.D.								
+22°1280	6 14	67 51	51.4	1.69	3	8.7 8.7	·090	W.B.
Ho. 232 ...	6 16	75 16	353.4	2.75	1	9.5 11.0	·225	H.F.
Ho. 25 ...	6 16	64 43	244.5	0.76	3	8.8 9.0	·201	W.B.
			248.9	0.90	1	...	·208	H.F.
Σ 899 ...	6 17	72 22	22.6	2.27	1	7.0 8.0	·047	W.B.
Ho. 233 ...	6 17	73 26	37.9	2.08	3	8.2 11.0	·180	W.B.
B.D.								
+24°1270	6 21	65 24	208.1	2.79	2	9.0 9.1	·056	W.B.
β 1021 ...	6 25	61 32	93.6	0.75	1	8.0 9.0	·208	H.F.
ΟΣ 149 ...	6 30	62 38	267.8	0.80	2	6.5 9.0	·188	H.F.
B.D.								
+23°1480	6 39	66 27	79.3	1.75	2	8.5 9.0	·056	W.B.
Ho. 328 ...	6 41	71 41	189.4	0.39	3	8.5 8.5	·180	W.B.
β 899 ...	6 55	71 9	265.0	0.78	1	8.7 9.3	·208	H.F.
B.D.								
+24°1508	6 57	65 24	21.2	1.63	2	9.0 9.2	·056	W.B.
ΟΣ 165 ...	7 3	73 55	36.0	4.30	1	5.0 10.7	·167	L.
Ho. 518 ...	7 4	59 30	147.5	2.77	1	8.0 10.0	·044	W.B.
			151.6	2.82	1	...	·225	H.F.
Σ 1037 ...	7 7	62 36	295.3	0.70	2	7.1 7.1	·211	W.B.
W.B. (2)								
VII. 118	7 7	74 40	156.1	2.02	3	8.2 8.7	·138	W.B.
			159.0	1.87	1	...	·156	L.
ΟΣ 170 ...	7 12	80 32	107.7	1.41	3	7.5 7.5	·133	W.B.
			107.4	1.62	2	...	·162	L.
Σ 1066 ...	7 14	67 50	207.3	6.72	1	3.2 8.2	·183	W.B.
Ho. 243 ...	7 16	60 33	166.9	2.20	2	9.3 9.5	·230	W.B.
			166.5	2.36	1	...	·241	L.
β 1024 ...	7 16	60 31	89.4	1.46	1	9.0 11.0	·244	W.B.
B.D.								
+22°1678	7 20	67 43	176.1	2.14	2	8.7 10.3	·162	W.B.
Procyon ...	7 34	84 31	5.3	4.46	1	0.5 1.4	·167	L.
Σ 1126 ...	7 35	84 32	143.3	1.13	1	7.2 7.5	·205	W.B.
Ho. 247 ...	7 40	68 42	108.2	0.42	4	7.5 8.0	·163	W.B.
			109.8	0.48	1	...	·208	H.F.
Ho. 36 ...	7 41	64 18	298.1	0.60	3	8.5 8.5	·145	W.B.
Σ 1196 AB	8 6	72 3	349.1	1.14	3	5.0 5.7	·234	W.B.
AC	...	...	109.6	5.51	3	5.0 6.5	·234	W.B.

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Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° ' "	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
$\Sigma$ 1196 BC	...	...	121°1	6'13	3	5.7 6.5	'234	W.B.
$\frac{AB}{2}$ C	...	...	114°8	5.45	2	5.0 6.5	'190	W.B.
B.D. + 23° 1978	8 31	66 24	184°1	1.54	3	9.2 10.2	'150	W.B.
Ho. 354 ...	8 36	63 35	181°4	0.57	1	8.2 8.8	'159	W.B.
			182°0	0.87	2	...	'255	H.F.
Ho. 251 ...	8 40	64 19	154°0	3.57	1	8.5 12.2	'277	Bk.
			153°0	4.00	1	...	'277	W.B.
$\Sigma$ 1273 $\frac{AB}{2}$ C	8 41	83 13	231°6	3.33	1	3.8 7.7	'285	H.F.
B.D. + 23° 2004	8 45	66 30	258°6	2.24	1	9.0 9.1	'225	H.F.
			257°5	2.20	2	...	'269	W.B.
			257°0	2.00	2	...	'269	Bk.
Ho. 43 ...	9 13	68 47	302°7	0.47	1	8.0 8.5	'277	W.B.
			296°5	0.43	1	...	'277	Bk.
O $\Sigma$ 201 ...	9 18	61 39	223°6	1.66	2	7.5 9.0	'174	W.B.
$\Sigma$ 1348 ...	9 19	83 13	324°8	1.78	1	7.5 7.6	'219	L.
			319°2	1.98	2	...	'255	W.B.
Ho. 368 ...	9 32	64 12	105°0	1.01	3	8.5 8.9	'229	W.B.
			112°9	1.13	2	...	'255	H.F.
			110°5	1.09	1	...	'285	Bk.
$\Sigma$ 1389 ...	9 47	62 32	307°3	2.30	2	8.0 9.0	'186	W.B.
W.B.(2)X. 128-9	10 9	71 38	6°5	1.25	3	8.0 8.5	'235	W.B.
			10°2	1.77	1	...	'277	Bk.
O $\Sigma$ 215 ...	10 11	71 46	206°1	0.90	4	7.0 7.2	'238	W.B.
			206°3	1.22	1	...	'225	H.F.
$\Sigma$ 1424 ...	10 14	69 39	113°3	3.60	2	2.0 3.5	'225	W.B.
			116°5	3.70	1	...	'260	Bk.
$\Sigma$ 1429 ...	10 20	64 53	250°2	1.02	2	8.3 8.3	'214	W.B.
O $\Sigma$ 227 ...	10 36	78 44	341°0	0.64	1	7.5 8.5	'353	L.
$\Sigma$ 1523 ...	11 13	57 54	137°2	2.62	1	4.0 5.0	'189	W.B.
$\Sigma$ 1527 ...	11 14	75 11	16°1	3.38	1	6.9 8.1	'260	W.B.
			16°5	3.45	1	...	'260	Bk.
$\Sigma$ 1536 ...	11 19	78 55	55°0	2.36	2	3.9 7.1	'284	L.
			50°3	2.18	2	...	'255	W.B.
Lalande 21846	11 24	58 59	4°7	0.95	2	7.0 11.5	'286	L.
O $\Sigma$ 235 ...	11 27	28 22	178°7	0.35	1	6 7	'277	W.B.

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Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° '	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
O $\Sigma$ 235 ...	11 27	28 22	182°2	0'35	1	6 7	·277	Bk.
$\beta$ 603 ...	11 44	75 10	310°8	...	1	6·4 10·2	·219	L.
			319°5	1°01	1	...	·353	L.
Ho. 255 ...	12 2	68 57	133°2	2°15	1	8·2 12·3	·353	L.
Ho. 536 ...	12 16	54 26	97°4	3°84	1	8·5 9·7	·241	L.
			95°6	3°41	1	...	·320	W.B.
$\Sigma$ 1639 ...	12 20	63 52	353°3	0°36	1	6·7 7·9	·372	W.B.
$\Sigma$ 1643 ...	12 22	62 25	37°7	2°22	1	8·7 9·2	·260	W.B.
			38°4	2°14	1	...	·260	Bk.
$\Sigma$ 1687 ...	12 48	68 13	84°1	1°23	1	5·2 8·0	·348	L.
$\Sigma$ 1728 ...	13 5	71 57	193°7	0°60	1	6·0 6·0	·348	L.
			193°2	0°49	1	...	·372	W.B.
Ho 260 ...	13 19	60 15	312°9	0°76	1	8·3 8·5	·342	W.B.
$\beta$ 113 ...	13 24	78 0	203°7	1°33	1	8·2 11·0	·285	H.F.
			200°6	1°75	1	...	·285	Bk.
$\beta$ 801 ...	13 41	78 40	325°2	2°88	1	8·2 10·2	·405	L.
			326°6	2°83	1	...	·285	H.F.
			327°7	2°59	1	...	·285	Bk.
$\Sigma$ 1785 ...	13 45	62 31	297°7	1°55	3	7·2 7·5	·313	W.B.
			304°3	1°42	1	...	·285	H.F.
			300°8	1°51	2	...	·281	Bk.
$\Sigma$ 1863 ...	14 35	38 0	86°2	0°65	2	7·1 7·4	·299	W.B.
$\Sigma$ 1865 ...	14 36	75 51	143°8	0°37	1	3·5 3·9	·413	W.B.
Hu. 575 ...	14 38	70 5	152°5	0°69	1	9·0 9·5	·405	L.
$\Sigma$ 1871 ...	14 38	39 11	294°6	1°90	2	7·0 7·0	·299	W.B.
Hu. 576 ...	14 41	69 25	190°5	5°00	1	8·2 13°0	·405	L.
$\Sigma$ 1888 ...	14 47	70 29	174°1	2°41	2	4·7 6·6	·463	W.B.
$\beta$ 31... ...	14 48	70 51	198°6	1°51	1	8·4 9·7	·512	W.B.
O $\Sigma$ 288 ...	14 49	73 53	187°7	1°72	1	6·4 7·1	·413	W.B.
$\Sigma$ 1909 ...	15 1	41 57	241°9	4°32	1	5·2 6·1	·350	W.B.
			245°4	4°36	1	...	·353	L.
$\Sigma$ 3090 ...	15 4	90 35	99°9	1°56	1	8·8 8·9	·449	L.
Ho. 60 ...	15 10	54 44	42°7	0°45	1	8·0 8·0	·353	L.
$\Sigma$ 1932 ...	15 14	62 48	152°9	0°48	1	5·6 6·1	·350	W.B.
$\Sigma$ 1938 ...	15 21	52 18	65°2	1°06	3	6·7 7·3	·356	L.
Hu. 649 ...	15 21	40 7	50°2	4°44	2	8·2 13°0	·371	L.
$\Sigma$ 1941 ...	15 22	63 2	223°2	1°73	1	8·7 8·7	·367	L.
Ait. 82 ...	15 23	65 44	311°1	0°98	1	8·5 9·3	·512	W.B.

Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° '	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
OZ 296 ...	15 23	45 39	304°6	1"48	1	...	'350	W.B.
			306°9	1'72	1	7°0 8'6	'367	L.
Σ 1950 ...	15 26	64 9	91°0	4°07	1	6°7 8'2	'367	L.
Hu. 651 ...	15 26	39 13	343°0	1°03	2	8°2 12'8	'371	L.
Σ 1956 ...	15 30	47 51	40°0	1°97	2	8°0 9'4	'310	W.B.
Σ 1959 ...	15 31	54 57	242°1	2°27	1	8°7 10'2	'277	W.B.
OZ 298 ...	15 33	49 52	187°6	1°17	1	7°0 7'3	'350	W.B.
Hu. 652 ...	15 33	40 51	175°7	0°79	1	8°5 8'8	'367	L.
Σ 1967 ...	15 39	63 23	118°0	0°72	2	4°0 7'0	'360	L.
Σ 1969 ...	15 39	29 40	49°5	0°52	1	8°0 8'7	'386	W.B.
			49°8	0°60	1	...	'386	H.F.
Hu. 657 ...	15 43	39 1	310°5	0°57	1	8°5 8'5	'367	L.
B 621 ...	15 47	45 8	54°7	0°40	1	7°5 8'0	'367	L.
Hu. 658 ...	15 51	38 16	341°9	2°63	1	8°4 13'0	'367	L.
Σ 3101 ...	15 54	92 47	68°7	2°37	1	8°2 8'5	'449	L.
Σ 1991 ...	15 54	48 3	198°0	3°56	2	8°2 9'5	'309	W.B.
Σ 2000 ...	15 56	75 45	225°9	2°46	1	8°2 9'0	'389	W.B.
OZ 303 ...	15 56	76 27	142°5	0°80	1	7°4 7'9	'512	W.B.
Σ 2004 ...	15 59	60 52	276°1	1°45	1	8°7 9'7	'350	W.B.
Σ 2005 ...	16 0	96 1	143°6	1°43	1	6°5 8'8	'449	L.
Σ 2011 ...	16 4	60 44	70°3	2°63	1	7°2 9'8	'397	W.B.
Σ 2025 ...	16 8	42 11	165°2	2°69	1	7°6 10'9	'367	L.
Σ 2032 ...	16 11	55 54	216°3	4°80	1	5°0 6'1	'397	W.B.
Σ 2037 ...	16 14	72 22	242°9	1°45	1	9°0 9'0	'389	W.B.
Σ 2055 ...	16 26	87 48	60°5	1°18	2	4°0 6'1	'466	L.
			59°6	1°52	1	...	'468	W.B.
Σ 2061 ...	16 29	58 55	22°8	2°38	1	7°1 9'9	'389	W.B.
Σ 2080 ...	16 35	51 28	25°3	3°17	1	8°0 11'8	'389	W.B.
Σ 2084 ...	16 38	58 13	187°1	1°40	2	3°0 6'5	'527	W.B.
Σ 2091 ...	16 39	48 37	304°8	0°98	2	7°5 8'0	'385	W.B.
De. 15 ...	16 41	46 20	303°4	0°46	1	8°2 8'6	'397	W.B.
Σ 2106 ...	16 46	80 25	296°2	0°35	1	6°7 8'4	'468	W.B.
			305°2	0°32	1	...	'482	L.
Σ 2107 ...	16 48	61 10	354°0	0°34	2	6°5 8'0	'477	W.B.
			357°0	0°35	1	...	'482	L.
Σ 3106 ...	16 50	85 1	252°3	2°28	1	8°6 8'6	'545	W.B.
Σ 2112 ...	16 54	58 3	258°8	1°98	2	8°5 9'5	'393	W.B.
Σ 2114 ...	16 57	81 24	160°8	0°97	1	6°2 7'4	'389	W.B.

Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° ′	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
Σ 2156 ...	17 19	90 45	34°8	3"38	2	8.3 9.0	.537	W.B.
Ho. 415 ...	17 19	64 9	331°8	1'17	2	8.0 8.7	.527	W.B.
Σ 2162 ...	17 20	53 25	279°2	1'37	1	8.7 9.2	.446	L.
B.D. + 36°2862	17 19	53 7	255°7	1'54	1	8.7 10.0	.446	L.
Σ 2168 ...	17 23	54 10	200°0	2'56	1	7.5 8.2	.397	W.B.
			197°4	2'46	1	...	.449	L.
Σ 2170 ...	17 24	79 26	270°5	3'88	1	8.5 9.0	.449	L.
Σ 2187 ...	17 31	85 48	177°0	2'99	1	8.3 9.3	.454	H.F.
Σ 2186 ...	17 31	88 56	79°6	2'77	1	7.5 7.5	.454	H.F.
Σ 2200 ...	17 39	84 6	167°7	1'42	1	8.0 8.8	.454	H.F.
Σ 2205 ...	17 40	72 14	308°7	1'98	1	8.3 8.7	.512	W.B.
Σ 2206 ...	17 40	71 58	246°5	1'30	2	8.1 9.7	.477	W.B.
Σ 2215 ...	17 41	72 15	294°3	0'71	1	5.9 7.9	.512	W.B.
Σ 2212 ...	17 41	84 16	337°7	3'13	1	8.5 8.8	.482	L.
			340°3	3'13	1	...	.528	W.B.
Σ 2222 ...	17 43	75 7	59°7	2'35	2	7.5 9.2	.471	W.B.
Σ 2233 ...	17 47	87 4	73°2	2'72	1	7.5 10.3	.490	L.
Σ 2239 ...	17 48	61 43	318°6	2'55	2	8.5 9.0	.471	W.B.
Aitken 234	17 49	64 23	19°5	0'48	1	8.8 9.1	.481	L.
Σ 2240 ...	17 49	84 44	199°4	2'97	2	9.0 9.7	.479	W.B.
Aitken 235	17 49	64 59	69°7	0'46	1	7.9 8.1	.481	L.
Σ 2244 ...	17 52	89 55	278°9	1'05	1	6.9 7.1	.490	L.
Σ 2245 ...	17 52	71 39	113°3	2'70	2	7.0 7.0	.471	W.B.
Σ 2250 ...	17 54	96 51	166°6	7'45	1	8.0 9.0	.515	H.F.
Σ 2252 ...	17 54	87 57	23°6	4'01	2	8.0 8.3	.479	W.B.
Σ 2254 ...	17 54	77 33	265°1	3'43	2	8.3 8.7	.479	W.B.
Ho. 565 ...	17 59	63 56	67°1	0'55	1	8.3 8.3	.481	L.
Σ 2272 ...	18 1	87 27	178°2	2'10	12	4.5 6.0	.562	W.B.
Σ 2281 ...	18 5	86 1	Star round		1	5.7 7.2	.616	L.
			16°2	0'18	2	...	.700	W.B.
Σ 2292 ...	18 8	62 23	271°2	1'05	1	8.0 8.1	.624	L.
Σ 2294 ...	18 9	89 51	279°6	0'38	1	7.4 7.7	.616	L.
Σ 2303 ...	18 15	98 2	223°7	2'36	1	6.7 9.2	.622	W.B.
Σ 2314 ...	18 19	66 36	329°4	2'64	2	8.4 9.6	.480	W.B.
Ho. 83 ...	18 20	62 29	92°7	0'69	2	8.2 8.4	.616	L.
			87°9	0'70	1	...	.726	W.B.
Ho. 84 ...	18 20	62 37	317°7	3'81	1	9.0 11	.481	L.
			315°6	4'33	1	...	.726	W.B.



Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° '	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
Σ 2315 ...	18 21	62 40	197°3	0'27	1	7.0 8.0	.481	L.
Ho. 85 ...	18 22	61 57	194.4	5.05	2	8.0 12	.549	L.
Σ 2319 ...	18 23	70 46	189.2	5.33	2	7.2 7.7	.480	W.B.
Σ 2328 ...	18 26	60 9	72.5	3.47	2	8.0 8.3	.664	W.B.
			71.4	3.81	1	...	.481	L.
Σ 2341 ...	18 30	78 38	181.3	1.74	1	8.5 9.7	.481	L.
Σ 2347 ...	18 33	90 28	256.5	3.04	1	7.5 9.4	.622	W.B.
Ho. 437 AB	18 37	58 27	302.1	0.43	1	8.3 8.5	.674	L.
CD	...	...	336.7	3.21	1	...	.674	L.
			288.1	22.29	1	...	.674	L.
Σ 2367 AB	18 37	59 48	74.4	0.31	1	7.0 7.5	.674	L.
AC	...	...	193.2	19.48	1	...	.674	L.
Σ 2397 ...	18 43	58 42	265.2	3.90	2	7.2 9.5	.664	W.B.
Σ 2402 ...	18 45	79 26	203.4	0.97	1	8.0 8.4	.701	L.
β 647 ...	18 52	76 32	9.1	0.96	2	9.0 9.2	.711	W.B.
B.D.								
+15°3627	18 52	74 21	33.8	1.15	1	8.5 9.5	.682	L.
Hu. 676 ...	18 53	74 18	10.8	3.15	1	7.2 10.0	.674	L.
B.D. +	18 53	74 12	103.2	1.62	1	8.9 10.0	.682	L.
14°3718, AB								
Σ 2426 BC	18 55	77 16	168.2	3.08	2	8.2 11	.692	L.
Hu. 677 ...	18 56	77 6	219.7	1.06	1	8.8 9.5	.701	L.
Ho. 93 ...	18 58	75 43	323.0	1.19	2	7.5 12.0	.711	W.B.
			317.5	1.14	1	...	.682	L.
Σ 2481 ...	19 8	51 24	220.9	4.03	1	8.0 8.0	.695	W.B.
Σ 2502 ...	19 16	50 56	206.2	1.70	1	8.2 10.2	.695	W.B.
Ho. 576 ...	19 16	83 22	182.1	4.19	1	7.0 10.7	.616	L.
Σ 2505 ...	19 16	54 38	315.4	10.79	1	8.0 8.7	.695	W.B.
Σ 2525 ...	19 23	62 52	312.8	0.66	3	7.5 7.7	.761	W.B.
Σ 2599 ...	19 49	67 17	53.6	3.91	1	7.8 9.5	.539	L.
			50.7	4.14	1	...	.545	W.B.
Σ 2600 ...	19 51	67 47	54.9	3.67	1	8.3 9.7	.539	L.
			57.3	3.25	1	...	.545	W.B.
A.C. 16 ...	19 54	63 1	56.4	0.39	1	7.8 8.2	.800	W.B.
B.D.								
+21°3994	19 54	68 8	277.7	1.53	1	9.0 10.4	.758	W.B.
Ho. 583 ...	19 55	68 10	255.8	1.53	1	9.0 10.7	.726	W.B.
OΣ 395 ...	19 58	65 20	104.1	0.68	1	5.8 6.2	.800	W.B.
Σ 2616 ...	19 58	75 42	261.8	3.85	1	6.8 9.7	.539	L.

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Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° '	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
Σ 2616 ..	19 58	75 42	264° 2	3' 52"	1	6.8 9.7	.545	W.B.
Σ 2620 ...	19 59	78 30	285° 3	2' 05	2	8.2 9.3	.548	W.B.
Σ 2626 ...	20 0	59 45	122° 9	1' 28	2	8.0 8.2	.635	W.B.
Σ 2651 ...	20 9	74 9	101° 8	1' 63	2	8.0 8.0	.548	W.B.
Σ 2662 ...	20 14	79 20	43° 0	1' 92	3	8.2 11.0	.650	W.B.
Σ 2666 ...	20 15	49 35	241° 6	2' 48	1	6.5 8.7	.685	H.F.
Σ 2665 ...	20 15	75 57	18° 8	3' 65	1	6.5 9.2	.545	W.B.
Σ 2672 ...	20 17	66 34	293° 7	1' 01	3	8.7 8.8	.653	W.B.
Σ 2673 ...	20 18	77 0	329° 9	2' 39	2	8.0 9.5	.623	W.B.
Σ 2676 ...	20 19	63 11	169° 2	2' 35	2	7.8 10.0	.623	W.B.
β 670 ...	20 28	76 24	38° 8	0' 57	1	8.5 8.9	.726	W.B.
Σ 2696 ...	20 29	84 54	300° 6	0' 74	3	8.0 8.4	.717	H.F.
Σ 2703 ...	20 32	75 37	219° 1	2' 37	2	7.6 7.6	.613	W.B.
Σ 2701 ...	20 32	78 18	204° 7	3' 42	1	7.8 8.2	.813	H.F.
β 151 ...	20 33	75 45	51° 3	0' 25	2	4.7 6.1	.763	W.B.
Σ 2711 ...	20 35	59 51	223° 8	2' 14	1	8.0 9.0	.690	H.F.
			223° 3	2' 35	2	...	.723	W.B.
Σ 2716 ...	20 37	58 3	46° 3	2' 22	1	6.0 8.2	.685	H.F.
Σ 2720 ...	20 39	73 25	180° 3	3' 83	2	8.5 8.7	.691	W.B.
Σ 2721 ...	20 39	70 29	29° 8	2' 51	2	8.0 10.0	.698	W.B.
Σ 2724 ...	20 40	66 26	146° 7	2' 50	2	8.2 8.3	.691	W.B.
Σ 2723 ...	20 40	78 3	103° 1	1' 35	2	7.3 8.0	.613	W.B.
Σ 2726 ...	20 42	59 39	362° 9	5' 31	2	4.0 9.2	.696	H.F.
Σ 2730 ...	20 46	84 0	337° 2	3' 50	2	7.8 7.9	.695	H.F.
Σ 2735 ...	20 51	85 51	285° 3	2' 07	2	6.2 7.7	.718	W.B.
			285° 4	2' 05	1	...	.685	H.F.
Σ 3113 ...	20 55	29 2	91° 6	1' 21	1	8.7 8.7	.033	H.F.
OΣ 527 ...	21 3	85 15	271° 1	0' 35	1	6.5 8.0	.800	W.B.
Σ 2765 ...	21 6	80 51	264° 4	3' 12	2	7.8 8.0	.701	W.B.
Ho. 152 ...	21 8	62 4	322° 0	0' 42	1	8.4 8.5	.800	W.B.
OΣ 535 ...	21 10	80 24	8° 2	0' 24	4	4.5 5.0	.766	L.
			7° 3	0' 22	8	...	.800	W.B.
			2° 2	0' 30	3	...	.797	H.F.
Σ 2802 ...	21 38	56 38	188° 3	3' 78	3	8.0 8.0	.828	W.B.
Ho. 165 ...	21 38	71 29	73° 8	0' 36	2	8.0 8.2	.760	W.B.
			79° 8	0' 39	1	...	.846	L.
Ho. 166 ...	21 40	62 38	82° 2	0' 33	1	7.5 7.5	.717	L.
			82° 8	0' 33	3	...	.735	W.B.

Star's Name.	R.A. 1900. h m	N.P.D. 1900. ° '	Posi- tion Angle.	Dis- tance.	No. of Nights.	Mags.	Epoch 1905.	Obs.
$\beta$ 89 ...	21 40	64 49	113°3'	0'23"	3	3.9 4.4	.797	L.
			113°3'	0'26"	9	...	.809	W.B.
			112°0'	0'37"	3	...	.800	H.F.
$\Sigma$ 2824 ...	21 40	64 49	297°9'	12'62"	2	4.3 10.0	.739	W.B.
			297°3'	12'49"	1	...	.717	L.
Hu. 693 ...	21 40	39 54	226°0'	1'07"	1	8.7 9.2	.895	W.B.
$\Sigma$ 2825 ...	21 42	89 36	117°3'	0'98"	1	8.0 8.2	.895	W.B.
Ho. 608 ...	21 42	63 10	123°2'	0'49"	2	8.2 9.7	.782	L.
Ho. 467 ...	21 46	68 13	187°2'	1'27"	1	8.0 10.2	.895	W.B.
Ho. 171 ...	21 48	62 41	171°8'	0'81"	4	8.0 8.2	.791	W.B.
Ho. 609 AB	21 51	60 45	357°5'	3'16"	1	9.5 9.8	.909	L.
$\Sigma$ 2847 ...	21 53	93 58	301°4'	1'12"	1	7.6 8.0	.895	W.B.
Ho. 610 ...	21 57	63 38	224°4'	0'69"	1	9.0 9.2	.717	L.
$\Sigma$ 2856 ...	22 1	85 37	199°4'	1'27"	1	8.2 8.8	.895	W.B.
$\Sigma$ 2862 ...	22 2	89 55	101°7'	2'58"	1	7.8 7.9	.895	W.B.
Ho. 179 ...	22 8	60 20	266°1'	0'45"	4	8.0 8.5	.823	W.B.
$\Sigma$ 2900 ...	22 19	63 39	177°8'	1'38"	2	...	.775	W.B.
			181°5'	1'51"	2	6.0 9.2	.878	L.
Espin. 147 ...	22 21	35 29	18°6'	2'42"	1	8.3 10.2	.895	W.B.
$\Sigma$ 2905 ...	22 22	75 42	283°1'	3'24"	1	8.0 8.0	.909	L.
$\Sigma$ 2906 ...	22 22	53 4	3°1'	4'03"	1	7.0 10.6	.706	H.F.
Ho. 475 ...	22 28	64 4	318°8'	0'79"	3	8.0 8.2	.847	W.B.
Ho. 480 ...	22 34	61 0	229°2'	0'69"	1	8.0 9.1	.758	W.B.
$\Sigma$ 2929 ...	22 34	79 59	175°3'	2'01"	1	9.0 9.5	.830	W.B.
Ho. 296 ...	22 36	75 59	72°3'	0'35"	2	5.5 5.5	.848	W.B.
$\Sigma$ 2934 ...	22 37	69 5	138°8'	0'86"	2	8.2 9.2	.843	W.B.
$\Sigma$ 2942 ...	22 40	51 4	281°3'	2'81"	1	6.5 8.8	.794	H.F.
			282°6'	2'67"	1	...	.936	W.B.
$\Sigma$ 3000 ...	23 14	65 20	50°2'	3'10"	1	8.7 8.8	.025	W.B.
Ho. 489 ...	23 21	62 48	238°1'	0'46"	3	7.5 7.5	.871	W.B.
$\beta$ 720 ...	23 29	59 14	178°3'	0'29"	1	5.9 6.0	.887	W.B.
$\Sigma$ 3026 ...	23 31	61 39	279°8'	3'21"	1	8.8 9.3	.025	W.B.
Ho. 201 ...	23 32	55 55	341°9'	3'71"	1	8.0 9.3	.936	W.B.
Ho. 203 ...	23 34	55 0	132°4'	3'54"	1	9.0 10.0	.936	W.B.
$\beta$ 858 ...	23 36	58 0	261°1'	0'55"	1	7.7 8.2	.887	W.B.
$\beta$ 994 ...	23 39	65 27	299°1'	1'41"	1	7.9 11.0	.909	L.
A.G.C. 14 ...	23 39	61 12	200°7'	1'24"	1	5.0 9.5	.887	W.B.
Ho. 206 ...	23 54	56 17	187°8'	2'06"	1	8 10	.936	W.B.

*The New Reduction of the Meridian Observations of Groombridge.*  
By Lewis Boss.

More than a year in advance of publication the Astronomer Royal at Greenwich kindly transmitted to me a manuscript catalogue of certain desired star positions newly deduced from the observations of Groombridge, 1810, by Frank W. Dyson, F.R.S., and William G. Thackeray, F.R.A.S., and later a set of revised proofs of the ledger of observations. This afforded an opportunity for comparison with my standard catalogue as well as for the extension of the same. After the work on the three higher of our five classes of stars had been substantially completed, it was found that there were available for comparison 570 well determined stars in common with positions taken from the revised catalogue of Groombridge. Accordingly a careful comparison of these stars was executed, in order to determine the relation of Groombridge's positions (revised) to those of the enlarged Standard Catalogue. The results of this comparison are outlined in the present communication.

The system of standards employed is essentially that of the *Catalogue of 627 Principal Standard Stars* (*Astron. Journ.*, Nos. 531-2), slightly modified in minor details since that publication. The results here presented are derived from the later of two successive approximations, each element of systematic correction having been essentially freed from the effect of other elements previous to the definitive derivation.

It became evident on examining the comparisons in R.A. that the element of difference, Stand.-Groomb., that has for its argument R.A. ( $\Delta\alpha$  and  $\Delta'\alpha \tan \delta$ ), is, on the whole, the more important as well as complicated. Eliminating the greater part of the difference having the argument declination, and arranging in zones; we have the differences, S.-G., in Table I. In order to fit these residual differences for the treatment finally adopted they are converted into  $\Delta\alpha \cot \delta$ , which in the close polar zone does not differ very greatly from  $\Delta\alpha \cos \delta$ .

It is known that the transit observations of Groombridge do not usually afford the means for satisfactory determination of the polar deviation of the line of collimation. The authors call particular attention to this (Int., p. 10). Moreover the adopted values of collimation are liable to much uncertainty. We may, therefore, anticipate that there will be errors in the deduced right ascensions of the form  $n \tan \delta$ , or the form  $n \left( 1 - \tan \frac{90^\circ - \delta}{2} \right)$ . The origin of the latter form of correction is to be attributed to a defective determination of the collimation, as Professor Turner has pointed out (*Monthly Notices*, vol. xlv.), and it may exist when  $n \tan \delta$  is otherwise well determined.